



AMENDMENTS TO THE CLAIMS

1. (Currently Amended) ~~A deep~~ An ultraviolet light-emitting device in which a p-type semiconductor is used, comprising:

said p-type semiconductor being prepared by supplying a p-type impurity raw material at the same time or after starting supply of ~~predetermined~~ two of three types of crystal raw materials, besides before starting supply of the other types type of crystal raw ~~materials~~ material than said ~~predetermined~~ two types of crystal raw materials in one cycle ~~wherein~~ during which all the three types of crystal raw materials ~~of said plural types of crystal raw materials~~ are supplied ~~in one time~~ once each in case of making crystal growth by supplying alternately ~~said plural~~ the three types of crystal raw materials in a pulsed manner;

~~said predetermined types of crystal raw materials are Al and Ga;~~

~~said other type of crystal raw material than said predetermined types of crystal raw materials is N; and~~

~~a composition of Al being 20% or greater.~~

2. (Currently Amended) ~~A deep~~ An ultraviolet light-emitting device in which a p-type semiconductor is used as claimed in claim 1 wherein said ~~p-type impurity raw material is Mg~~ two types of crystal raw materials are group III elements; and

said other type of crystal raw material is a group V element.

3. (Currently Amended) An ultraviolet light-emitting device in which a p-type semiconductor is used comprising:

said p-type semiconductor being prepared by supplying a p-type impurity raw material at the same time or after starting supply of predetermined types of crystal raw materials, besides before starting supply of other types of crystal raw materials than said predetermined types of crystal raw materials in one cycle ~~wherein~~ during which all the types of crystal raw materials of said plural types of crystal raw materials are supplied ~~in one time~~ once each in case of making crystal growth by supplying alternately said plural types of crystal raw materials in a pulsed manner;

said predetermined types of crystal raw materials are the group II elements; and

~~other~~ said types of crystal raw materials than said predetermined types of crystal raw materials are the group VI elements.

4. (Cancelled)

5. (Currently Amended) ~~A deep~~ An ultraviolet light-emitting device in which a p-type semiconductor is used, comprising:

a desired number of times for a cycle consisting of:

a first step wherein supply of TMGa, TMAI, and Cp₂Mg is commenced at a first timing, and supply of TMGa, TMAI, and Cp₂Mg is finished at a second timing at which supply of TMGa, TMAI, and Cp₂Mg which has been continued for a predetermined period of time was completed; and

a second step wherein supply of NH_3 is commenced immediately after or after the second timing at which supply of TMGa, TMAI, and Cp_2Mg was completed, and supply of NH_3 is finished at a third timing at which supply of NH_3 which has been continued for a predetermined period of time was completed;

being repeated, whereby said ultraviolet light-emitting device in which a p-type semiconductor is used is prepared ~~and a composition of Al is 20% or greater.~~

6. (Currently Amended) ~~A deep~~ An ultraviolet light-emitting device in which a p-type semiconductor is used, comprising:

said p-type semiconductor being prepared by supplying a p-type impurity raw material and an n-type impurity raw material ~~at close timing with each other~~ for their respective immediately adjacent periods of time at the same time or after starting supply of predetermined plural types of crystal raw materials, besides before starting supply of other types of crystal raw materials than said predetermined plural types of crystal raw materials in one cycle ~~wherein~~ during which all the types of crystal raw materials of said plural types of crystal raw materials are supplied ~~in one time~~ once each in case of making crystal growth by supplying alternately said plural types of crystal raw materials in a pulsed manner;

~~said predetermined types of crystal raw materials are Al and Ga;~~

~~said other type of crystal raw material than said predetermined types of crystal raw materials is N; and~~

~~a composition of Al being 20% or greater.~~

7. (Currently Amended) ~~A deep~~ An ultraviolet light-emitting device in which a p-type semiconductor is used as claimed in claim 6 wherein:

said p-type semiconductor is prepared by starting supply of said p-type impurity raw material in synchronous with commencement of supply ~~for said Al and Ga~~ of said predetermined plural types of crystal raw materials; starting supply of said n-type impurity raw material after finishing supply of said p-type impurity raw material; and finishing supply of said n-type impurity ~~before commencement of~~ in synchronous with finishing supply of said predetermined plural types of crystal raw materials and then starting supply for N of said other type of crystal raw materials than said predetermined plural types of crystal raw materials.

8. (Currently Amended) ~~A deep~~ An ultraviolet light-emitting device in which a p-type semiconductor is used as claimed in claim 6 wherein:

said p-type semiconductor is prepared by maintaining a period of time wherein said p-type impurity raw material and said n-type impurity raw material are supplied at the same time, respectively.

9. (Currently Amended) ~~A deep~~ An ultraviolet light-emitting device in which a p-type semiconductor is used as claimed in any one of claims 6, 7, and 8 wherein:

~~said supply of Al and Ga being carried out alternately with respect to that of N in a pulsed manner;~~

~~said first impurity raw material is Mg; and~~

~~said second impurity raw material is Si.~~

said predetermined plural types of crystal raw materials are the group III elements; and
said other types of crystal raw materials than said predetermined plural types of crystal
raw materials are the group V elements.

10. (Previously Presented) An ultraviolet light-emitting device in which a p-type semiconductor is used comprising:

said p-type semiconductor being prepared by supplying a p-type impurity raw material and an n-type impurity raw material ~~at close timing with each other~~ at their respective adjacent timings at the same time or after starting supply of predetermined plural types of crystal raw materials, besides before starting supply of other types of crystal raw materials than said predetermined plural types of crystal raw materials in one cycle wherein all the types of crystal raw materials of said plural types of crystal raw materials are supplied ~~in one time~~ once each in case of making crystal growth by supplying alternately said plural types of crystal raw materials in a pulsed manner;

said predetermined plural types of crystal raw materials are the group II elements; and
said other types of crystal raw materials than said predetermined plural types of crystal raw materials are the group VI elements.

11. (Cancelled)

12. (Currently Amended) ~~A deep~~ An ultraviolet light-emitting device in which a p-type semiconductor is used, comprising:

a desired number of times for a cycle consisting of:

a first step wherein supply of TMGa, TMAI, and Cp_2Mg is commenced at a first timing, and supply of Cp_2Mg is finished at a second timing at which supply of Cp_2Mg which has been continued for a predetermined period of time was completed during the supply of TMGa and TMAI;

a second step wherein supply of TESi is commenced immediately after or after the second timing at which supply of Cp_2Mg was finished, and supply of TMGa, TMAI, and TESi is finished during the supply of TMGa and TMAI at a third timing at which supply of TESi has been continued for a predetermined period of time was completed; and

a third step wherein supply of NH_3 is commenced immediately after or after the third timing at which supply of TMGa, TMAI, and TESi was completed, and supply of NH_3 is finished at a fourth timing at which supply of NH_3 which has been continued for a predetermined period of time was completed;

being repeated, whereby said ultraviolet light-emitting device in which a p-type semiconductor is used is prepared, ~~and a composition of Al is 20% or greater.~~

13. (Currently Amended) ~~A deep~~ An ultraviolet light-emitting device in which a p-type semiconductor is used as claimed in any one of claims 1, 2, 5, 6, ~~7, 8, 11, and 12,~~ and 17 wherein:

a small amount of N is continuously supplied in case of preparing said p-type semiconductor.

14. (Currently Amended) ~~A deep~~ An ultraviolet light-emitting device in which a p-type semiconductor is used, comprising:

said p-type semiconductor being composed of AlGa_N prepared by laminating a first crystal layer formed from Ga and Al, and a second crystal layer formed from N;

~~a~~ said first crystal layer formed from said Ga and Al being doped with Mg and Si for their respective adjacent periods of time; and

~~Mg and Si being placed closely in said crystal layer formed from Ga and Al at a predetermined ratio;~~

~~a composition of Al being 20% or greater.~~

15. – 16. (Cancelled)

17. (New) An ultraviolet light-emitting device in which a p-type semiconductor is used, comprising;

said p-type semiconductor being prepared by supplying a p-type impurity raw material at the same time or after starting supply of predetermined types of crystal raw materials, besides before starting supply of other types of crystal raw materials than said predetermined types of crystal raw materials in one cycle during which all the types of crystal raw materials of said plural types of crystal raw materials are supplied once each, in case of making crystal growth by supplying alternatively said plural types of crystal raw materials in a pulsed manner;

said predetermined types of crystal raw materials being the group III elements and said other types of crystal raw materials being the group V elements;

said group III elements are Al and Ga, and said group V element is N;

supply of said Al and Ga are carried out alternatively with respect to that of N in a pulsed manner; and

said p-type impurity raw material is Mg and supplied only during the supply of Al and Ga.

18. (New) An ultraviolet light-emitting device in which a p-type semiconductor is used as claimed in claim 17, wherein the ratio of said Al to AlGa_N is not less than 20%.

19. (New) An ultraviolet light-emitting device in which a p-type semiconductor is used as claimed in claim 17, wherein the ratio of said Al is between 30% and 60%.

20. (New) An ultraviolet light-emitting device in which a p-type semiconductor is used as claimed in claim 10, wherein said p-type semiconductor is prepared by starting supply of said p-type impurity raw material in synchronous with commencement of supply of said predetermined plural types of crystal raw materials;

starting supply of said n-type impurity raw material after finishing supply of said p-type impurity raw materials; and

finishing supply of said n-type impurity before commencement of supply of other types of crystal raw materials than said predetermined plural types of crystal raw materials.

21. (New) An ultraviolet light-emitting device in which a p-type semiconductor is used as claimed in claim 10, wherein said p-type semiconductor is prepared by maintaining a period

of time wherein said p-type impurity raw material and n-type impurity raw material are supplied at the same time.

22. (New) An ultraviolet light-emitting device in which a p-type semiconductor as used claimed in claim 9 wherein said group III elements are Al and Ga and said group V element is N;

supply of said Al and Ga is carried out alternatively with respect to that of N in a pulsed manner;

said first impurity raw materials is Mg; and

said second impurity raw material is Si.

23. (New) An ultraviolet light-emitting device in which a p-type semiconductor is used as claimed in claim 14, wherein said second crystal layer is not doped with impurities.

24. (New) An ultraviolet light-emitting device in which a p-type semiconductor is used as claimed in claim 23, wherein said first crystal layer is doped with Mg and Si for their respective adjacent periods of time but said second crystal layer is not doped with impurities whereby said p-type semiconductor comes to have high conductivity.